



PAVEMENT MAINTENANCE MANAGEMENT

		<i>Paragraph</i>	<i>Page</i>
CHAPTER	1. INTRODUCTION		
	Purpose	1-1	1-1
	Applicability.....	1-2	1-1
	Scope.....	1-3	1-1
	Implementation of PAVER	1-4	1-1
	PAVER forms.....	1-5	1-1
	2. PAVEMENT NETWORK IDENTIFICATION		
	Introduction	2-1	2-1
Definitions	2-2	2-1	
Guidelines for pavement identification	2-3	2-1	
3. PAVEMENT CONDITION SURVEY AND RATING PROCEDURES			
Introduction	3-1	3-1	
Pavement condition rating	3-2	3-1	
Pavement inspection	3-3	3-1	
Inspection by sampling	3-4	3-2	
Calculating the PCI from inspection results	3-5	3-6	
4. MAINTENANCE AND REPAIR (M&R) GUIDELINES			
Introduction	4-1	4-1	
Pavement evaluation procedure	4-2	4-1	
Determination of feasible M&R alternative	4-3	4-12	
Establishing M&R priorities	4-4	4-12	
5. PROCEDURE FOR PERFORMING ECONOMIC ANALYSIS OF M&R ALTERNATIVES			
Introduction	5-1	5-1	
The procedure	5-2	5-1	
Computations.....	5-3	5-2	
6. DATA MANAGEMENT-MANUAL PAVER SYSTEM			
Introduction	6-1	6-1	
Manual system description	6-2	6-1	
Use of the manual data forms.....	6-3	6-1	
Manual record keeping system-General	6-4	6-12	
Record upkeep	6-5	6-12	
7. DATA MANAGEMENT-COMPUTERIZED PAVER SYSTEM			
Purpose	7-1	7-1	
Use of computerized PAVER	7-2	7-1	
System description	7-3	7-1	
System use and update	7-4	7-6	
APPENDIX	A. REFERENCES		A-1
	B. DISTRESS IDENTIFICATION GUIDE		B-1
	C. DEDUCT VALUE CURVES-ASPHALT SURFACED/JOINTED CONCRETE PAVEMENTS		C-1
	D. AUTOMATED PAVER REPORTS-DESCRIPTION AND USE.....		D-1
	E. BLANK SUMMARY AND RECORD FORMS.....		E-1

List of Tables

<i>Table</i>	<i>title</i>	<i>Page</i>
2-1	Branch Codes	2-2
4-1	General Classification of Asphalt Distress Types by Possible Causes	4-9
4-2	General Classification of Concrete Distress Types by Possible Causes	4-9
4-3	Design Index for Flexible Pavements for Roads and Streets, Traffic Categories I through IV	4-10
4-4	Asphalt Concrete Pavement Distress Types and M&R Alternatives	4-14
4-5	Jointed Concrete Pavement Distress Types and M&R Alternatives	4-15
4-6	Types of Overall Repair for Jointed Concrete and Asphalt-Surfaced Pavements.....	4-16
6-1	Material Codes	6-6
6-2	Typical Layer Materials Properties	6-8
6-3	Traffic Volume Index for Roads.....	6-8

List of Figures

<i>Figure</i>	<i>Title</i>	<i>Page</i>
2-1	Installation map showing typical pavement branches	2-2
2-2	Sections identified on an installation map	2-3
2-3	Installation map showing various methods of identifying parking area branches	2-4
2-4	Large parking area divided into several sections	2-5
2-5	Example of asphalt section divided into sample units	2-5
3-1	PCI scale and condition rating	3-1
3-2	Example of a completed DA Form 5145-R, Concrete Pavement Inspection Sheet	3-3
3-3	Example of a completed DA Form 5146-R, Asphalt Pavement Inspection Sheet	3-4
3-4	Determination of minimum number of sample units to be surveyed	3-5
3-5	Example selection of sample units to be surveyed	3-6
3-6	Steps for calculating PCI for a sample unit	3-7
4-1	Example of a completed DA Form 5147-R, Section Evaluation Summary	4-2
4-2	Procedure to determine critical minimum sample unit PCI based on mean PCI of section	4-3
4-3	Determination of long-term rate of deterioration for asphalt concrete (AC) pavements	4-4
4-4	Determination of long-term rate of deterioration for asphalt concrete (AC) overlay over AC pavements	4-5
4-5	Determination of long-term rate of deterioration for Portland cement concrete (PCC) pavement	4-6
4-6	Determination of long-term rate of deterioration for asphalt concrete (AC) overlay over Portland cement concrete (PCC) pavements	4-7
4-7	PCI vs age illustrating high short-term rate of deterioration	4-8
4-8	Thickness design requirements for flexible pavements (TM 5-822-5, 1 Oct 80, and AFM 88-24, Chap 3)	4-11
4-9	Process of determining M&R needs	4-13
5-1	Example of a completed DA Form 5148-R, Present Worth Computation Form	5-3
6-1	Example of a completed DA Form 5149-R, Branch Identification Summary	6-2
6-2	Example of a completed DA Form 5150-R, Section Identification Record	6-3
6-3	Example of a completed DA Form 5151-R, Section Pavement Structure Record	6-5
6-4	Example of a completed DA Form 5152-R, Section Materials Properties, Record	6-7
6-5	Example of a completed DA Form 5153-R, Section Traffic Record	6-10
6-6	Example of a completed DA Form 5154-R, Section Condition Record Card	6-11
6-7	Example of a completed DA Form 5155-R, Branch Maintenance and Repair Requirements	6-13
6-8	Example of a completed DA Form 5156-R, Section Maintenance and Repair Record	6-14
6-9	Example of a filing sequence for a manual record keeping system	6-15
7-1	Example of inspection report	7-2
7-2	Example of pavement ranking in an increasing order of PCI	7-3
7-3	Example of M&R requirements report	7-4
7-4	Example of economic analysis report	7-5

Photographs for Distress Identification-Asphalt-Surfaced Pavements

<i>Figure</i>	<i>Title</i>	<i>Page</i>
B-1	Low-severity alligator cracking	B-3
B-2	Low-severity alligator cracking	B-3
B-3	Medium-severity alligator cracking	B-3
B-4	Medium-severity alligator cracking	B-3
B-5	Medium-severity alligator cracking	B-3
B-6	High-severity alligator cracking	B-4
B-7	High-severity alligator cracking	B-4
B-8	Low-severity bleeding	B-4
B-9	Medium-severity bleeding	B-4
B-10	High-severity bleeding	B-5
B-11	Low-severity block cracking	B-6
B-12	Medium-severity block cracking	B-6
B-13	Medium-severity block cracking	B-6
B-14	High-severity block cracking	B-6
B-15	Low-severity bumps and sags	B-7
B-16	Medium-severity bumps and sags	B-7
B-17	Medium-severity bumps and sags	B-7
B-18	Medium-severity bumps and sags	B-8
B-19	High-severity bumps and sags	B-8
B-20	Low-severity corrugation	B-8
B-21	Medium-severity corrugation	B-9
B-22	Medium-severity corrugation	B-9
B-23	High-severity corrugation	B-9
B-24	Low-severity depression	B-9
B-25	Medium-severity depression	B-10
B-26	High-severity depression	B-10
B-27	Low-severity edge cracking	B-10
B-28	Medium-severity edge cracking	B-10

	Page	
B-29	High-severity edge cracking	B-11
B-30	High-severity edge cracking	B-11
B-31	Low-severity joint reflection cracking	B-11
B-32	Medium-severity joint reflection cracking	B-12
B-33	High-severity joint reflection cracking	B-13
B-34	Low-severity lane/shoulder drop off	B-14
B-35	Medium-severity lane/shoulder drop off	B-14
B-36	High/severity lane/shoulder drop off-severity lane/shoulder drop off	B-14
B-37	High/severity lane/shoulder drop off	B-14
B-38	Low-severity longitudinal and transverse cracking	B-15
B-39	Medium-severity longitudinal and transverse cracking	B-15
B-40	Medium-severity longitudinal and transverse cracking	B-15
B-41	High-severity longitudinal and transverse cracking	B-15
B-42	Low-severity patching and utility cut patching	B-16
B-43	Low-severity patching and utility cut patching	B-16
B-44	Low-severity patching and utility cut patching	B-16
B-45	Medium-severity patch	B-16
B-46	High-severity patching and utility cut patching	B-17
B-47	Polished aggregate	B-17
B-48	Low-severity pothole	B-18
B-49	Low-severity pothole	B-18
B-50	Medium-severity pothole	B-18
B-51	High/severity pothole	B-18
B-52	High-severity pothole	B-19
B-53	Low-severity railroad crossing	B-19
B-54	Medium-severity railroad crossing	B-19
B-55	High-severity railroad crossing	B-19
B-56	Low-severity rutting	B-20
B-57	Low-severity rutting	B-20
B-58	Medium-severity rutting	B-20
B-59	High-severity rutting-5-59 High-severity rutting	B-20
B-60	Low-severity shoving-60 Low-severity shoving	B-21
B-61	Medium-severity shoving approaching high severity	B-21
B-62	High-severity shoving	B-21
B-63	Low-severity slippage cracking	B-21
B-64	Medium-severity slippage cracking	B-22
B-65	High-severity slippage cracking	B-22
B-66	Example swell; severity level is based on ride quality criteria	B-22
B-67	Low-severity weathering and raveling	B-23
B-68	Low-severity weathering and raveling caused by tracked vehicles	B-23
B-69	Medium-severity weathering and raveling	B-23
B-70	Medium-severity weathering and raveling	B-23
B-71	High-severity weathering and raveling	B-24
Photographs for Distress Identification-Jointed Concrete Pavements		<i>page</i>
B-72	Low-severity blow-up/buckling	B-24
B-73	Medium-severity blow-up/buckling	B-25
B-74	Medium -severity blow-up/buckling	B-25
B-75	High-severity blow-up/buckling approaching inoperative condition	B-25
B-76	Low-severity corner break.....	B-26
B-77	Low-severity corner break.....	B-26
B-78	Medium-severity corner break; defined by a medium-severity crack	B-27
B-79	High/severity corner break	B-27
B-80	Low-severity divided slab; majority of cracks are low severity	B-27
B-81	Medium-severity divided slab	B-27
B-82	High-severity divided slab caused by high-severity cracks	B-28
B-83	High-severity divided slab	B-28
B-84	High-severity divided slab	B-28
B-85	Low-severity durability cracking	B-29
B-86	Low-severity durability cracking	B-29
B-87	Medium-severity durability cracking	B-29
B-88	High-severity durability cracking	B-30
B-89	High-severity durability cracking	B-30
B-90	Low-severity faulting	B-30
B-91	Medium-severity faulting	B-30
B-92	Medium-severity faulting	B-31
B-93	High-severity faulting	B-31

B-94	Low-severity joint seal damage	B-31
B-95	Medium-severity joint seal damage	B-31
B-96	High-severity joint seal damage	B-32
B-97	High-severity joint seal damage	B-32
B-98	Low-severity lane/shoulder drop off	B-33
B-99	Medium-severity lane/shoulder drop off	B-33
B-100	High-severity lane/shoulder drop off	B-34
B-101	Low-severity linear cracking in a nonreinforced concrete slab	B-35
B-102	Low-severity linear cracking in a nonreinforced concrete slab	B-35
B-103	Medium-severity linear cracking in a reinforced concrete slab	B-35
B-104	Medium-severity linear cracking in a reinforced concrete slab	B-36
B-105	High-severity linear cracking in a nonreinforced concrete slab	B-36
B-106	High-severity linear cracking in a nonreinforced concrete slab	B-37
B-107	Low-severity patching, large and utility cuts	B-38
B-108	Low-severity patching, large and utility cuts	B-38
B-109	Medium-severity patching, large	B-38
B-110	Medium-severity patching, large	B-39
B-111	Medium-severity patching, utility cuts	B-39
B-112	High-severity patching, large	B-39
B-113	Low-severity patching, small	B-40
B-114	Medium-severity patching, small	B-40
B-115	High-severity patching, small	B-40
B-116	Polished aggregate	B-41
B-116	Polished aggregate	B-41
B-117	Popouts	B-41
B-118	Pumping	B-42
B-119	Pumping	B-42
B-120	Low-severity punchout	B-43
B-121	Medium-severity punchout	B-43
B-122	High-severity punchout	B-43
B-123	Low-severity railroad crossing	B-43
B-124	Medium-severity railroad crossing	B-43
B-124	Medium-severity railroad crossing	B-43
B-125	High-severity railroad crossing	B-43
B-126	Low-severity scaling/map cracking/crazing	B-44
B-127	Medium-severity scaling/map cracking/crazing	B-44
B-128	High-severity scaling/map cracking/crazing	B-44
B-129	High-severity scaling/map cracking/crazing	B-45
B-130	High-severity scaling/map cracking/crazing	B-45
B-131	Shrinkage cracks	B-45
B-132	Low-severity spalling, corner	B-46
B-133	Low-severity spalling, corner	B-46
B-134	Medium-severity spalling, corner	B-46
B-135	High-severity spalling, corner	B-47
B-136	Low-severity spalling, joint	B-48
B-137	Medium-severity spalling, joint	B-48
B-138	High-severity spalling, joint	B-48

Deduct Value Curves for Asphalt-Surfaced Pavements

C-1	Alligator cracking	C-2
C-2	Bleeding	C-3
C-3	Block cracking	C-4
C-4	Bumps and sags	C-5
C-5	Corrugation	C-6
C-6	Depression	C-7
C-7	Edge cracking	C-8
C-8	Joint reflection cracking	C-9
C-9	Lane/shoulder drop off	C-10
C-10	Longitudinal and transverse cracking	C-11
C-11	Patching and utility cut patching	C-12
C-12	Polished aggregate	C-13
C-13	Potholes	C-14
C-14	Railroad crossing	C-15
C-15	Rutting	C-16
C-16	Shoving	C-17
C-17	Slippage cracking	C-18
C-18	Swell	C-19
C-19	Weathering and raveling	C-20
C-20	Corrected deduct value curves for asphalt-surfaced pavements	C-21

	<i>Page</i>
C-21 Blow-ups	C-22
C-22 Corner break	C-23
C-23 Divided slab	C-24
C-24 Durability ("D") cracking	C-25
C-25 Faulting	C-26
C-26 Joint seal damage	C-27
C-27 Lane/shoulder drop off	C-28
C-28 Linear cracking.....	C-29
C-29 Patching, large and utility cuts	C-30
C-30 Patching, small.....	C-31
C-31 Polished aggregate	C-32
C-32 Popouts.....	C-33
C-33 Pump Shrinkage cracks	C-34
C-34 Punchouts	C-35
C-35 Railroad crossing	C-36
C-36 Scaling/map cracking/crazing	C-37
C-37 Shrinkage cracks	C-38
C-38 Spalling, corner	C-39
C-39 Spalling, joint.....	C-40
C-40 Corrected deduct value curves for jointed concrete pavements	C-41

Blank Summary and Record Forms

E-1	DA Form 5145-R, Concrete Pavement Inspection Sheet
E-2	DA Form 5146-R, Asphalt Pavement Inspection Sheet
E-3	DA Form 5147-R, Section Evaluation Summary
E-4	DA Form 5148-R, Present Worth Computation Form
E-5	DA Form 5149-R, Branch Identification Summary
E-6	DA Form 5149-1-R, Branch Identification Summary Continuation Sheet
E-7	DA Form 5150-R, Section Identification Record
E-8	DA Form 5151-R, Section Pavement Structure Record
E-9	DA Form 5152-R, Section Materials Properties Record
E-10	DA Form 5153-R, Section Traffic Record
E-11	DA Form 5154-R, Section Condition Record
E-12	DA Form 5155-R, Branch Maintenance and Repair Requirements
E-13	DA Form 51-R, Section Maintenance and Repair Record